Hybrid Reasoning Context Platform

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I. Introduction

With the rapid adoption of GPS enabled smart phones and the fact that users are almost permanently connected to the Internet, an evolution is observed towards applications and services that adapt themselves based on the user's context, for example taking into account personal interests, location or presence information. To facilitate the development of such new intelligent applications, new enabling platforms are needed to collect, distribute and exchange context information. An important aspect of such platforms is the derivation of new, high-level knowledge by combining different types of context information using reasoning techniques. To address these challenges we developed CASP, a Context Aware Service Platform that takes care of the aggregation and abstraction of context information using ontologies for representing the information.

II. Context Aware Service Platform

CASP has a layered architecture [1]. The *context framework layer* is the core layer and is detailed in figure 1. CASP contains two types of reasoners: a rule-based reasoner and a case-based reasoner. These reasoners are complementary when it comes to distilling new knowledge. Rules represent general knowledge of a particular domain, whereas cases capture specific knowledge. Therefore, the combination of both approaches turns out to be natural and useful [2].

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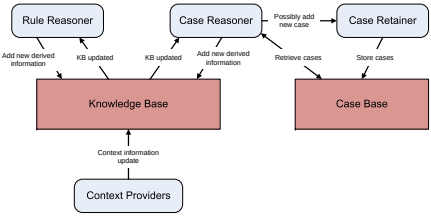

Figure 1. Detailed architecture of the core of CASP.

III. Use Cases

The combination of both reasoners is used in two use cases to derive extra useful information: in a desk sharing office scenario the hybrid approach allows to automatically learn typical trajectories of a user and improve localization on such trajects with 42%. The enhanced instant messaging communication service benefits from the reasoners to derive relationships between recognized keywords and learn the interests of the users in different contexts.

IV. Conclusions

In this paper we discussed the design of our context platform CASP incorporating rule-based as well as case-based reasoners which can be combined as a hybrid reasoner. This hybrid approach has been tested successfully in two application domains.

References

[1] M. Strobbe et al., *Design of CASP: an Open Enabling Platform for Context-Aware Office and City Service*, Proceedings of MUCS 2007.

[2] J. Prentzas et al., *Categorizing combining rule-based and case-based reasoning* Expert Systems, vol. 24, no. 2, 2007.